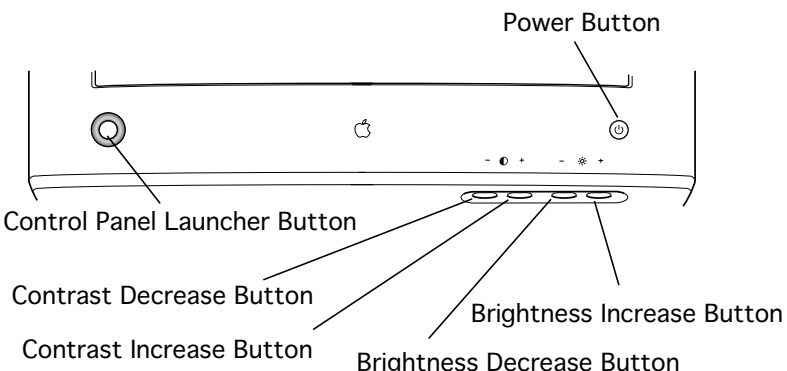
Adjustments

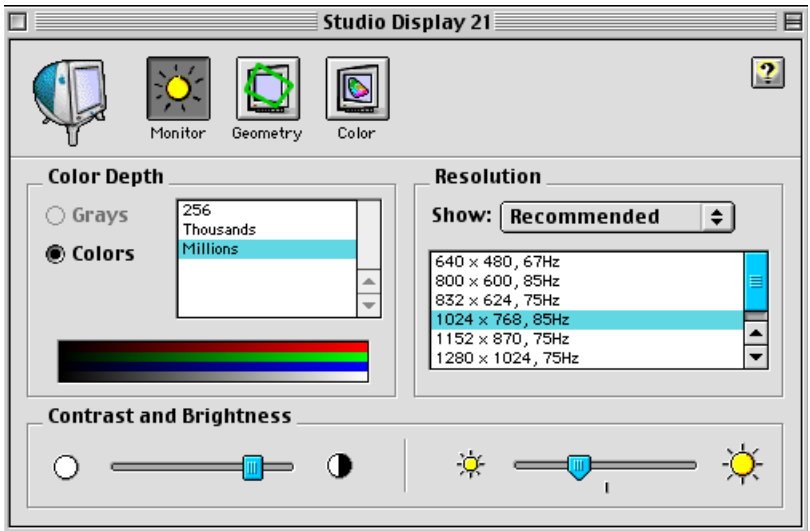
Studio Display (21" CRT, 19.8" viewable image size)

User Adjustments

The screen adjustment controls that are available to users are the front panel controls and those controls accessed by the Monitors control panel.

With the front panel controls, users can adjust brightness and contrast levels or use the control panel launcher button to open the Monitors control panel window.





Once the Apple Displays Software is installed on the Mac OS computer, users can use the Monitors control panel to optimize the display screen. Within the Monitors control panel, users can adjust color and geometry controls.

For more information, see Mac OS Help (Mac OS 8.5 or later) or Monitors Help, available when the Monitors control panel is active (Mac OS 8 or later).

Diagnostic Adjustments

Diagnostic adjustments are those display adjustments that can be made by a service provider, not by a user.

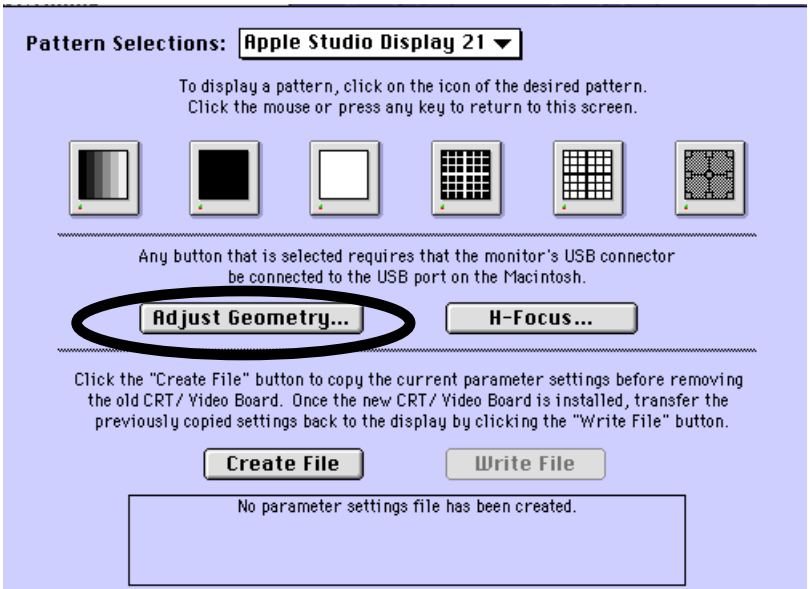
Diagnostic adjustments for this display require both

- The Monitors control panel
- The new USB Display Service Utility (USB DSU)

Important: New for this display is the USB Display Service Utility. This diagnostic utility is for use only with the USB-based Studio Display (21" CRT).

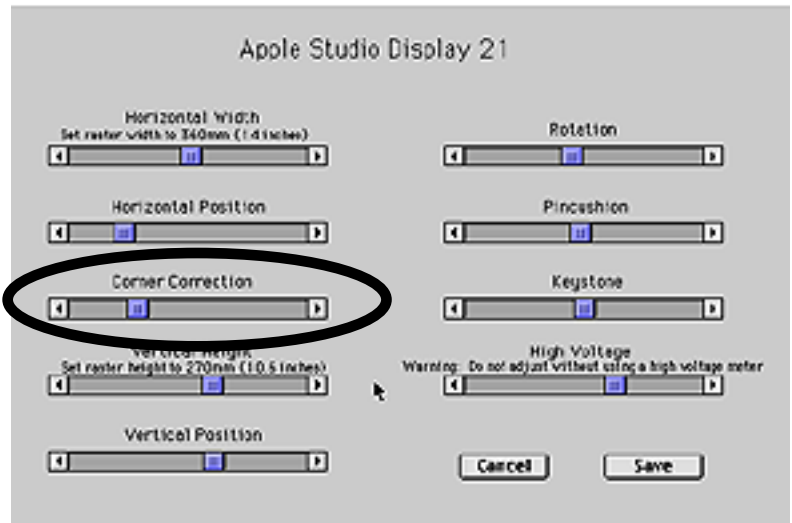
USB Display Service Utility

Important: In February 2000 version 2.1.2 of the USB Display Service Utility was introduced. Destroy previous versions of the USB Display Service Utility. To avoid loss of display parameter data, use only the latest version of the USB DSU.


Pattern Selections:
Apple Studio Display 21
To display a pattern, click on the icon of the desired pattern.
Click the mouse or press any key to return to this screen.
Any button that is selected requires that the monitor's USB connector be connected to the USB port on the Macintosh.
Adjust Geometry...
H-Focus...
Click the "Create File" button to copy the current parameter settings before removing the old CRT/ Video Board. Once the new CRT/ Video Board is installed, transfer the previously copied settings back to the display by clicking the "Write File" button.
Create File
Write File
No parameter settings file has been created.

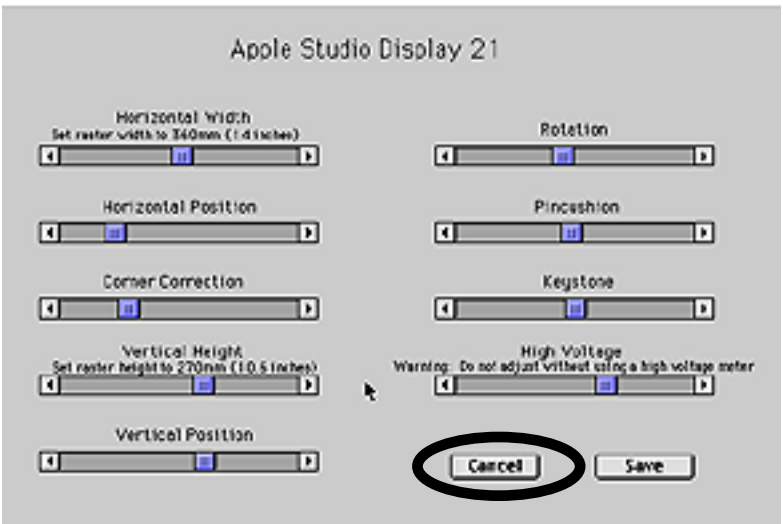
The USB Display Service Utility (USB DSU) works very much like the Display Service Utility that is used for other monitors; however, it includes a Corner Correction control. The Corner Correction is used to correct the shape of the corners of the screen.

You can access the Corner Correction control by clicking the Adjust Geometry button.



Corner Correction

When you click Adjust Geometry, a screen appears with the slider bar controls shown. Unique to this version of the Display Service Utility is the Corner Correction control. This control corrects the shape at the corners of the screen.



Unlike previous versions of the USB DSU, with version 2.1 or later if you click Cancel, any changes made are not saved and the screen reverts back to the previous look of the screen display. If you click Save, the changes are saved to both user and factory mode.

Safety Precautions for Working Inside the Display

Before you begin any procedures that require removing the housing, refer to the Take Apart chapter for complete removal instructions.

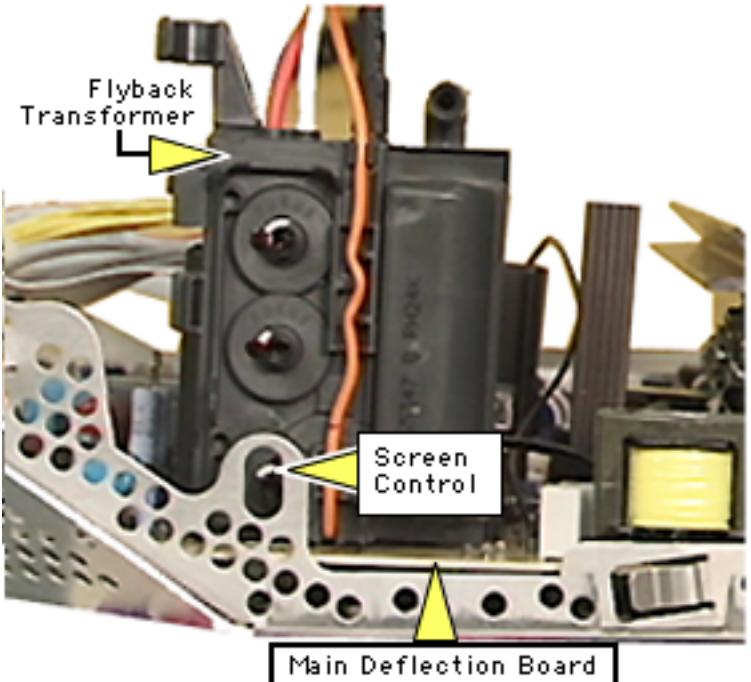
Warning: This product contains high voltage and a high-vacuum picture tube. To prevent serious injury, review CRT safety in Bulletins/Safety.

Warning: Because you make adjustments from the rear of the monitor, position a mirror to view the monitor screen. Do not reach around the monitor to adjust the controls.

Voltage Check at Power Board

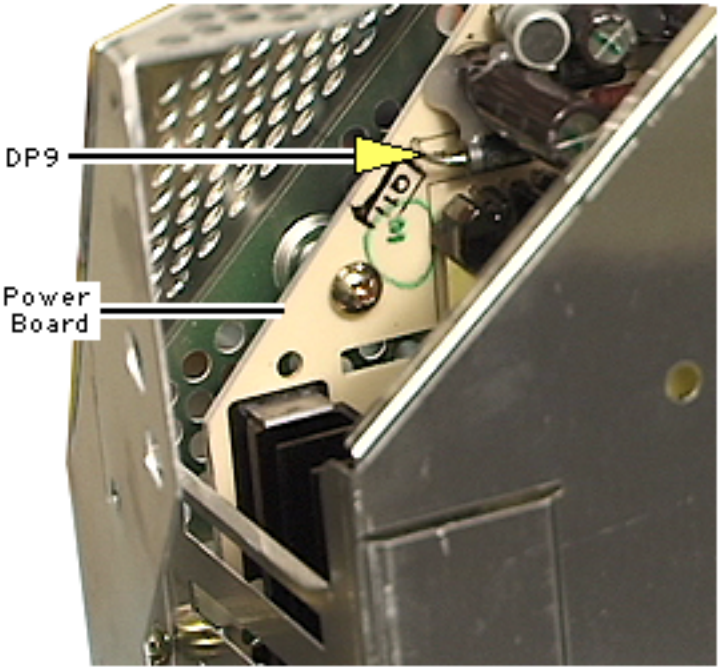
1 Turn on the monitor and set the screen resolution to 1152x870 at 75 Hz.

2 Open the USB Display Service Utility (USB DSU) and select the crosshatch pattern with the black background.



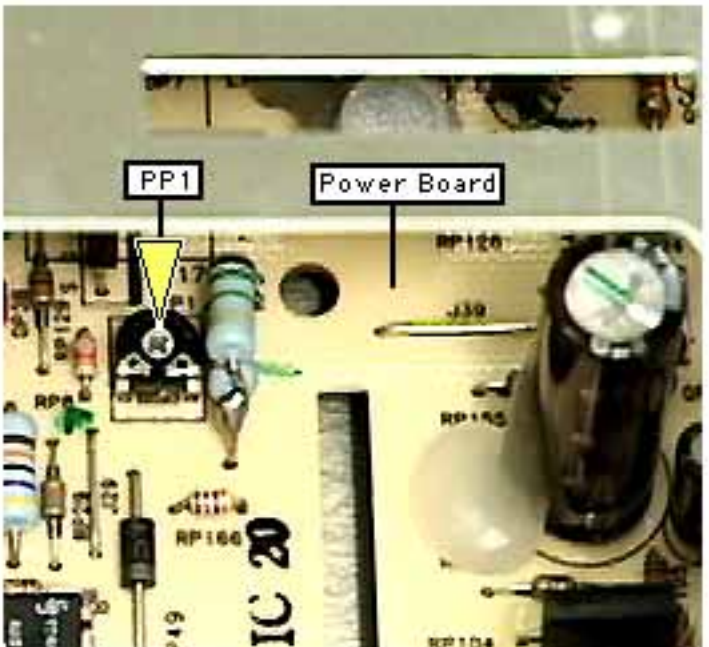
3 From the USB DSU, click Adjust Geometry. Set the Horizontal Width control to 385 mm (15 in) and the Vertical Height control to 288 mm (11 in). Confirm the screen dimensions with a tape measure.

4 Set the screen control (lowest control on the flyback transformer on the main deflection board) to minimum (counterclockwise).



5 Locate diode DP9 near the top edge of the power board.

6 Using a voltage meter, connect the negative probe to chassis ground and the positive probe to the cathode (striped end) of diode DP9. The voltage should read 6.7 V ± 0.05 V.
- If the voltage is in range, disconnect the probes and turn off the display.
- If the voltage is out of range, use a long



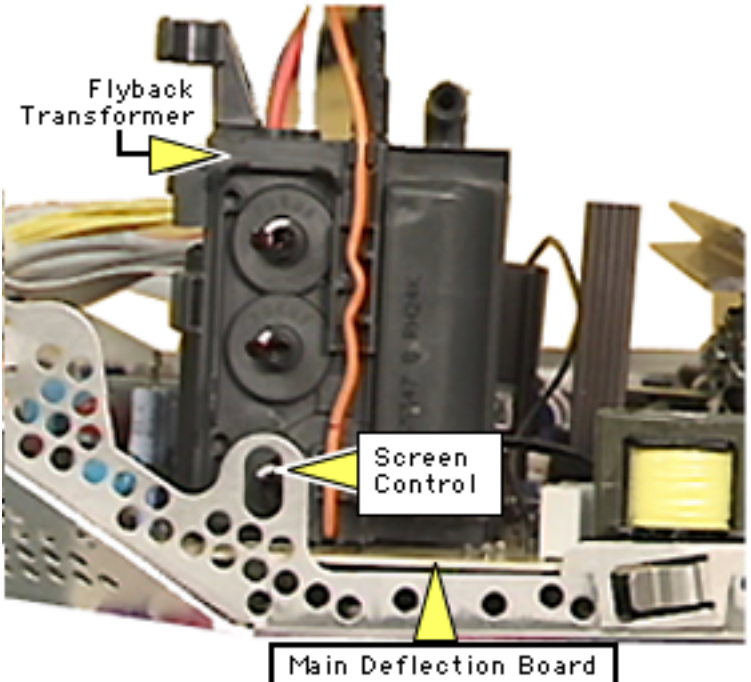
plastic hex adjustment tool to adjust potentiometer PP1, located near the top center of the power board, until the voltage comes into range.

- If the voltage cannot be adjusted into range, replace the power board as described in the Take Apart chapter.

Centering the Raster

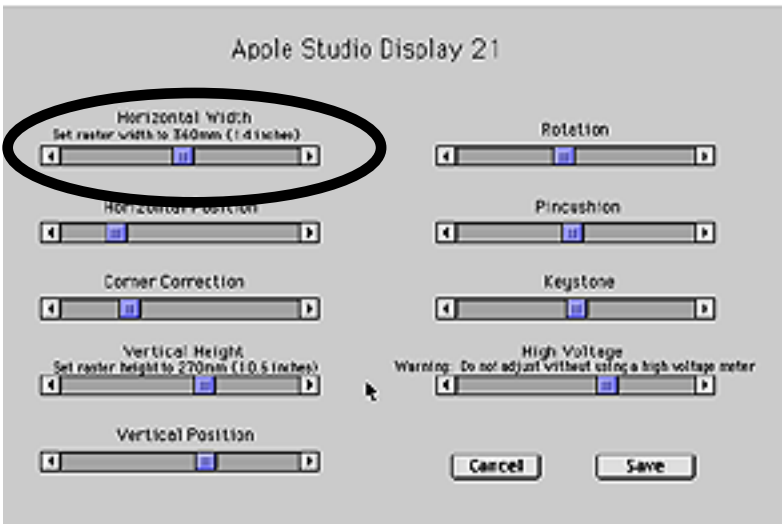
1 Turn on the monitor and set the screen resolution to 1600x1200 at 85 Hz.

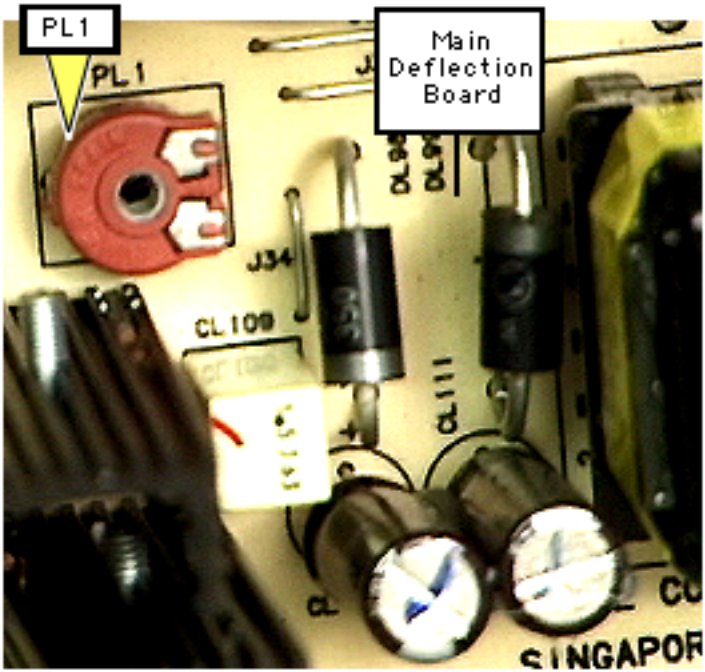
2 Open the USB Display Service Utility and select the crosshatch pattern with the black background.



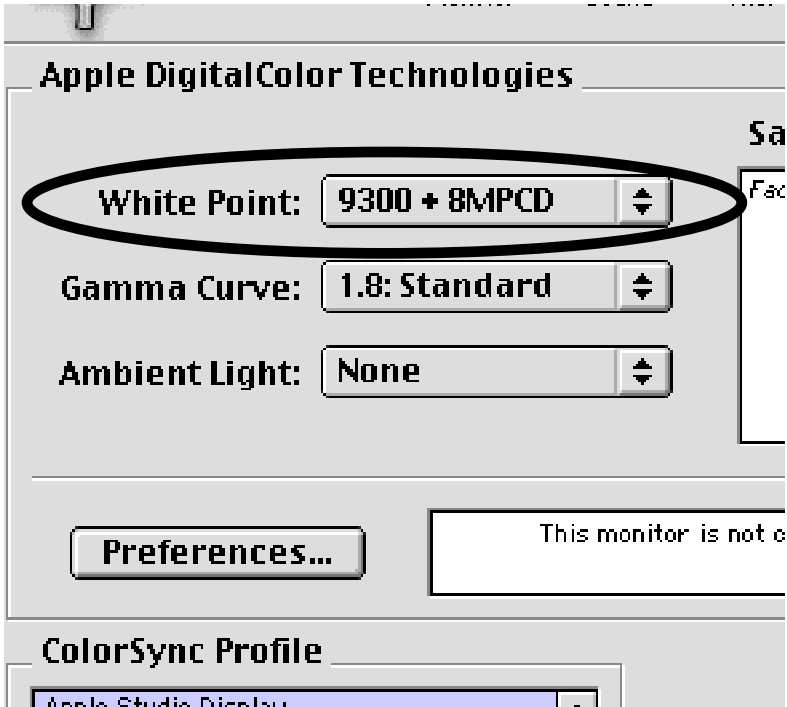
3 Adjust the screen control (lowest control on the flyback transformer on the main deflection board) until the background raster is visible.

4 From the USB DSU, click Adjust Geometry. Set the Horizontal Width control to 385 mm (15 in).



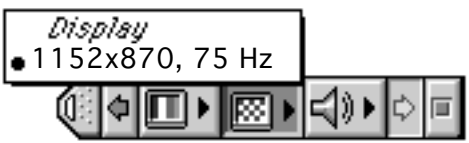


5 With the screen sized to a nominal width of 385 mm, adjust potentiometer PL1 to shift the raster 2 mm – 2.5 mm to the left side of the screen.



Screen Adjustment

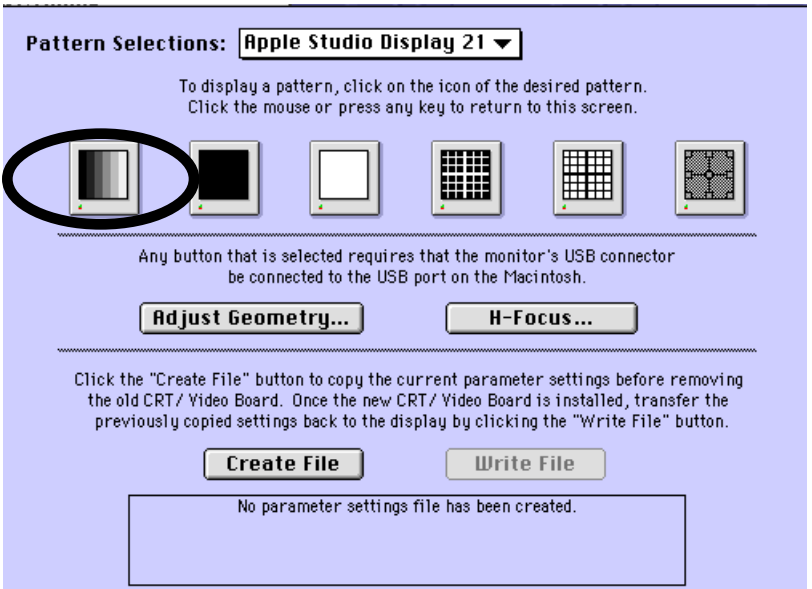
1. Turn on the display and let it warm up for five minutes.
2. Using the Color screen from the Monitors control panel, set white point to 9300 + 8MPCD (default).

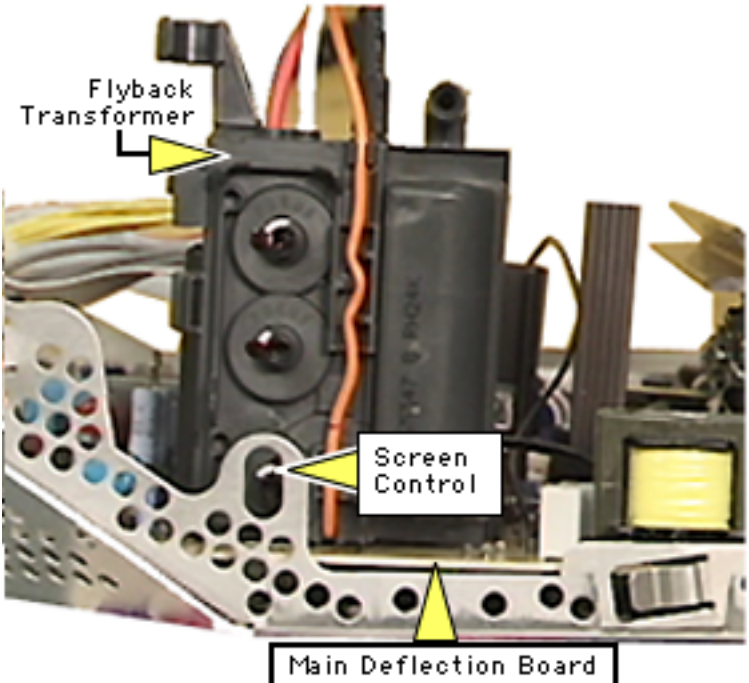


3 Using the control strip, set the screen resolution to 1152x870 at75 Hz.

4 Using the front panel controls, set
- Brightness to detent (mid-point)
- Contrast to maximum

5 Using the USB DSU, select the gray bars pattern.


Pattern Selections:
Apple Studio Display 21
To display a pattern, click on the icon of the desired pattern.
Click the mouse or press any key to return to this screen.
Any button that is selected requires that the monitor's USB connector be connected to the USB port on the Macintosh.
Adjust Geometry...
H-Focus...
Click the "Create File" button to copy the current parameter settings before removing the old CRT/ Video Board. Once the new CRT/ Video Board is installed, transfer the previously copied settings back to the display by clicking the "Write File" button.
Create File
Write File
No parameter settings file has been created.



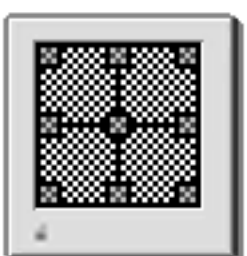
6 With the room lights dimmed, use a plastic screwdriver to slowly adjust the Screen control so that the leftmost bar is completely black.

7 Adjust the Screen control so the second bar appears as black as the leftmost bar. Then adjust so the second bar can be distinguished from the leftmost bar, but the leftmost bar remains black. Only the leftmost bar should be completely black.

Focus

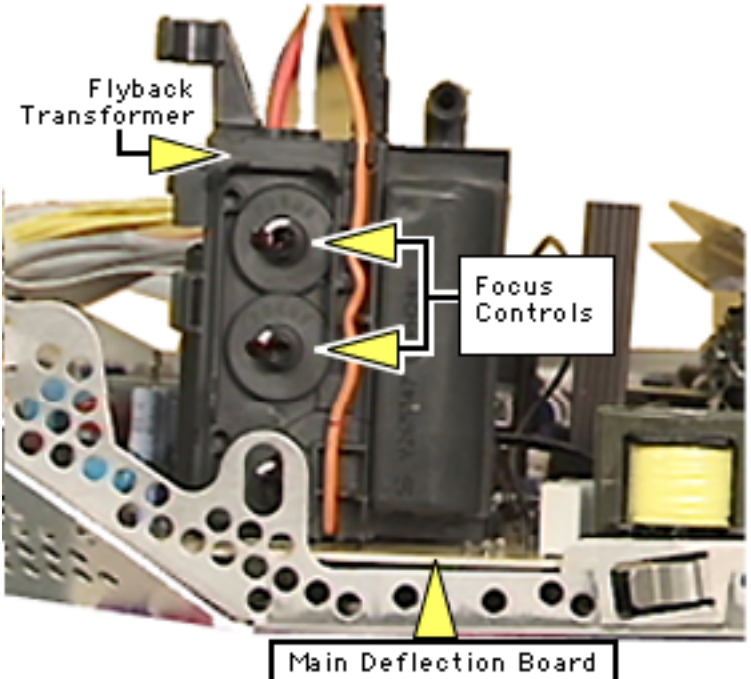
1 Open the Monitors control panel, and click Convergence for best overall convergence.

Note: Misadjusted convergence is often diagnosed as poor focus.



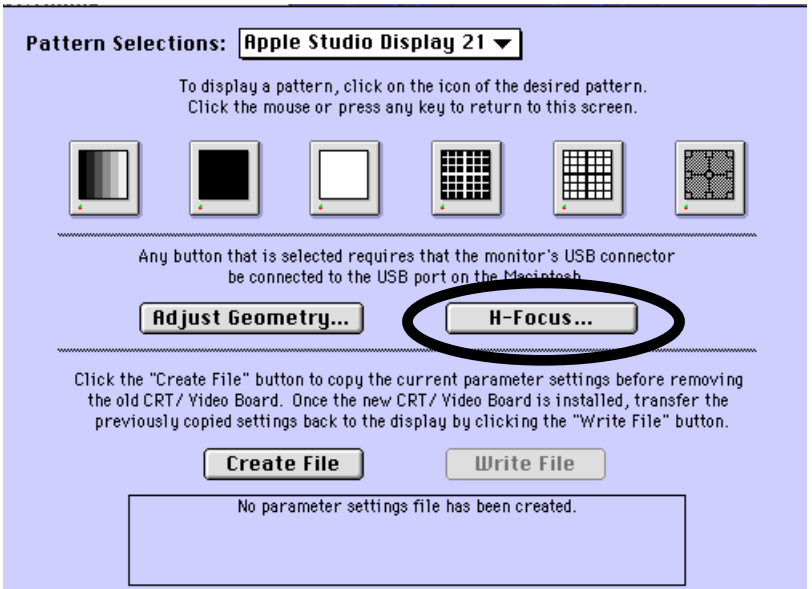
2 Using the control strip, set the screen resolution to 1600x1200 at 85 Hz.

3 Run the USB DSU, and select the focus pattern (percent signs).



4 Adjust horizontal and vertical focus controls (two top controls on the flyback transformer) for best center-of-screen performance. If necessary, readjust each focus control to optimize overall focus.

5 If the focus varies between the center of the screen and the outer edge, run the USB DSU and click the H-Focus button.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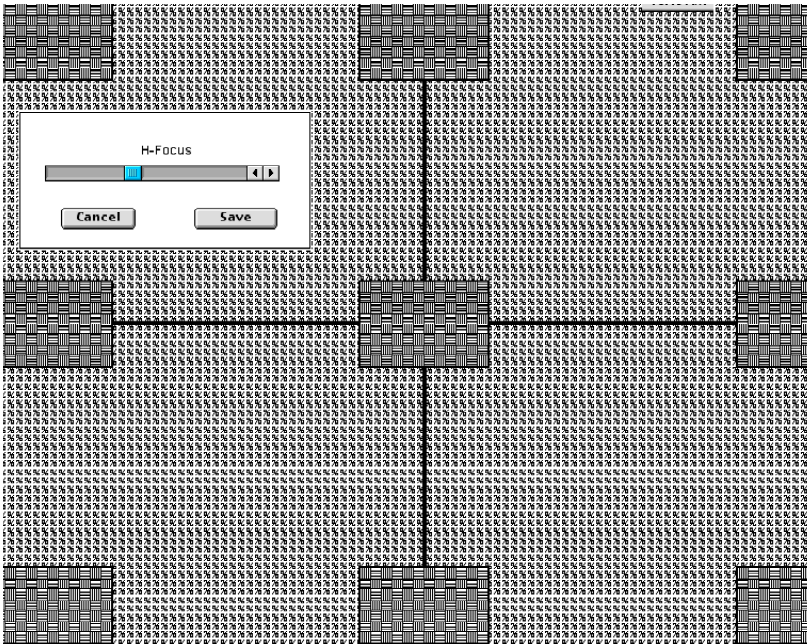


6 Clicking H-Focus brings up a screen you can use to improve the dynamic focus (overall focus with respect to center, sides, and top/bottom of screen).

Drag the H-Focus slider control to adjust overall focus.

Unlike previous versions of the USB DSU, with version 2.1 or later if you click Cancel, any changes made are not saved and the screen reverts back to the

previous look of the screen display. Click Save to save a new setting.

If necessary, repeat steps 3 and 4.

7 Using the control strip, set the screen resolution to 1152x870 at 75 Hz. Run the USB DSU and select the focus pattern (percent signs). If focus is not optimal, repeat steps 3 through 6 at this screen resolution. Then set the screen resolution to1600x1200 at 85 Hz, and check the focus pattern. If it is still not optimal, repeat steps 3 through 6 at 1600x1200 at 85 Hz.

Downloading Setup Parameters and Replacing the CRT/Video Board

Caution: The USB Display Service Utility (USB DSU) versions are not backward compatible. So a parameter file that is created by one version will not be recognized by another version. Therefore, to avoid loss of data, use only the latest version of the USB DSU for this entire procedure.

The following steps show the procedure for

- Creating (downloading) a parameter settings file
- Duplicating the parameter settings file
- Replacing the CRT/video board
- Writing (uploading) the parameter settings

Download Parameter Settings

1 Turn on the computer and the monitor.

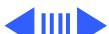
Important: If the Studio Display (21" CRT) screen is blank or unreadable, follow the steps in the section “Connecting a Second Display for Downloading Setup Parameters” in this chapter.

2 Open the USB Display Service Utility (USB DSU).

3 To download parameters from the CRT/video board, click Create File. A message appears explaining that the process will take about 30 seconds.

4 When the message disappears, a new file called Parameter Settings MBY is created on the same level as the USB Display Service Utility application.

Caution: To avoid loss of data, do not move or rename the Parameter Settings MBY file.



Duplicate the Parameter Settings File

1. Locate the Parameter Settings MBY file, but do not move or rename it.
2. Beside the Parameter Settings MBY file create a new folder.
3. Name the new folder Parameter File Backup.
4. Hold down the option key and drag the Parameter Settings MBY file onto the Parameter File Backup folder.
5. Shut down the monitor. Unplug the power cord.

Replace the CRT/Video Board

1. Remove the defective CRT/video board and replace it with a new CRT/video board. Refer to the CRT/Video Board topic in the Take Apart chapter.
2. Reattach the power cord. Restart the computer.

3 Open the USB DSU.

Upload Parameter Settings

1 To upload parameter settings, use the USB DSU and click Write File. A message appears explaining that the process will take about 2.5 minutes.

Note: If the Write File button is grayed out, this means the application can't find the Parameter Settings MBY file. Make sure you did not move or rename the original file.

Important: If the upload process is unsuccessful, an error message will appear and the Parameter Settings MBY file will not be deleted. In this case, restart the computer and turn the monitor off and on. Retry the upload procedure at least three times. If it still fails after the third attempt, replace the CRT/video board.

2 When the message disappears, quit the USB DSU.

3 Turn off the monitor. After about 5 seconds, turn on the monitor.

4 Check your version of Apple Displays Software.
- If using Apple Displays Software version 1.7.1 or earlier, drag the AppleVision Preferences file into the trash. Restart the computer.
- If using Apple Displays Software version 1.8 or later, open the Preferences folder; open the Apple Monitor Plugins Prefs folder; and drag the AppleVision Preferences file into the trash. Restart the computer.

5 Open the Monitors control panel, and click the Geometry button.

6 Hold down the option key and click Factory Settings.

7 Go to the next procedure: “Adjusting the Display after Replacing the CRT/Video Board.”

Adjusting the Display after Replacing the CRT/ Video Board

Caution: Perform this procedure only after you've replaced the CRT/video board and uploaded the parameter settings.

After replacing the CRT/video board, some adjustment is necessary. The following steps show the procedure for

- Adjusting screen geometry
- Recalibrating white points

Adjust Geometry

If the screen is displaying keystoning, open the USB Display Service Utility (USB DSU), and click the Adjust Geometry button. Using the keystone slider control, adjust the width of the top and bottom of the screen. If necessary, use the USB DSU to make other geometry adjustments.

Recalibrate White Points

Caution: If the video cable is connected to a third-party video card that uses proprietary color calibration drivers, you might need to disable the drivers to use the AppleVision color calibration functions.

1 After you've rewritten the file, as instructed in "Upload Parameter Settings," restart the system.

2 Open Monitors control panel, and select Color.

3 Select the default 9300 white point and click Recalibrate.
- If you later choose another white point such as 6500 or D50, you must click Recalibrate for the changes to take effect.
- If the display looks blurry after recalibrating, adjust convergence as described in the previous section.
- If you hold down the option key and click Factory

Settings, it might be necessary to perform a minor convergence adjustment using Monitors control panel.

4 If the Recalibration fails, a warning message will appear. Click OK and click Recalibrate again.

5 If the recalibration fails again, use the duplicated file to upload the parameter settings. (Hold down the option key and drag the Parameter Settings MBY file out of the Parameter File Backup folder; then follow the procedure under “Upload Parameter Settings.”) Adjust the display. If the recalibration fails again, click Recalibrate.

These multiple recalibration attempts might seem excessive, however tests have confirmed a high success rate at saving the display.

6 If the recalibration fails again (after the fourth attempt), call Apple Technical Support. (In the US, call 1-800-919-2775, option 3.)

Connecting a Second Monitor for Downloading Setup Parameters

If the Studio Display (21" CRT) screen is black or unreadable and you need to replace the CRT/video board, you can connect a second known-good monitor for viewing the USB DSU to download setup parameters.

Important: The setup for the second monitor depends on the computer system you are using (for PowerBooks, see the note and warning on the next page). In most cases, connect the video cable from the Studio Display (21" CRT) to the built-in video port and connect the second monitor (used for viewing) to the video card. However, if the menu bar does not appear on the known-good display with this common setup, shut down the system, switch the video cable connections, and restart the system.

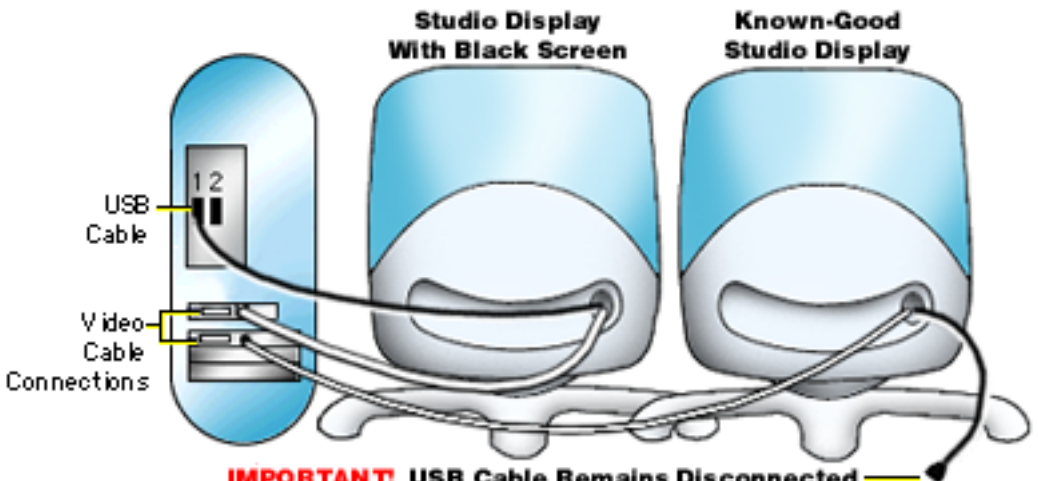
Important: If using a second Studio Display (21" CRT) as the known-good monitor, refer to “When the Second Display Is a Studio Display (21" CRT)” in this chapter.

Note: If a PowerBook G3 Series (Bronze keyboard) is available, connect the Studio Display (21" CRT) to the PowerBook as described in “When the Second Display is a PowerBook G3 Series (Bronze keyboard).”

Warning: If a PowerBook (FireWire) is available, connect the Studio Display (21" CRT) to the PowerBook as described in “When the Second Display is a PowerBook (FireWire).” You must follow this procedure exactly to avoid loss of data or functionality.

When the Second Display Is a Studio Display (21" CRT)

Important: When using a second Studio Display (21" CRT) as the known-good monitor, do not connect the known-good monitor's USB cable to the computer.



With the Studio Displays connected as shown, the menu bar should appear on the known-good monitor. However, if it does not appear on that monitor, shut down the system and switch the video cable connections on the back of the computer. When you turn on the displays, the menu bar should then appear on the known-good display.

1 With the menu bar on the known-good display, open the USB Display Service Utility.

2 Click Create File.

3 When the Create File process is finished, shut down both monitors.

4 Disconnect the known-good monitor from the computer and place it aside. (You are finished with it for this procedure.)

5 Replace the CRT/video board in the monitor that exhibited the symptom.

6 Turn on the monitor and computer:

- If the CRT/video board was the problem, you will see a screen image. The screen image might be out of adjustment, but it will be readable. Click Write File and continue the procedure described in “Downloading Setup Parameters and Replacing the CRT/Video Board” in this chapter. Then follow the steps in “Adjusting the Display after Replacing the CRT/Video Board.”.
- If the symptom still occurs, check for loose cable connections (external and internal) and check connections to the power board. If the symptom remains, reinstall the original CRT/video board in the monitor, and replace the main deflection board. Then follow the steps in “Adjusting the Display after Replacing the Main Deflection Board.”

When the Second Display Is a PowerBook G3 Series (Bronze keyboard)

When using the PowerBook G3 Series (Bronze keyboard) with a Studio Display (21" CRT) that displays a black screen, you can use the PowerBook's LCD to access the Studio Display's desktop. However, when you first connect the Studio Display (21" CRT) to the PowerBook G3 Series (Bronze keyboard), you will see a desktop with no menu bar.

To access the menu bar,

1 Shut down the PowerBook and disconnect the Studio Display (21" CRT).

2 With the Studio Display (21" CRT) disconnected, turn on the PowerBook.

3 When the desktop appears, locate the Display

Preferences file in the USB Display Service Utility folder.

4 Drag the new Display Preferences file into the Preferences folder (in the System Folder). This step replaces the Display Preferences.

5 Shut down the PowerBook and reconnect the Studio Display (21" CRT). Turn on the PowerBook and Studio Display.

6 Now you can launch the USB DSU to click Create File and replace the CRT/video board as described in “Downloading Setup Parameters and Replacing the CRT/Video Board” in the Adjustments chapter.

Once you have replaced the CRT/video board and need to make adjustments to the Studio Display (21" CRT) screen,

1 Shut down the PowerBook and reconnect the Studio

Display (21" CRT) video and USB cables.

2 Restart the PowerBook, but when you hear the startup chime, close the lid of the PowerBook so the video image will appear on the Studio Display only.

3 Once you see the Mac OS screen on the Studio Display, you can open the PowerBook lid.

4 Now you can adjust the Studio Display using the keyboard and trackpad on the PowerBook. Refer to “Adjusting the Display after Replacing the CRT/Video Board.”

When the Second Display Is a PowerBook (FireWire)

Warning: You must follow this procedure exactly to avoid loss of data or functionality.

Warning: The PowerBook (FireWire) automatically shows the menu bar on its screen when connected to a Studio Display (21" CRT). Do not move the menu bar to the Studio Display screen at any time when using the USB Display Service Utility. Doing so could cause loss of data or computer functionality.

Note: To distinguish the PowerBook (FireWire) from the PowerBook G3 Series (Bronze keyboard), note the two FireWire ports on the back of the PowerBook (FireWire).

When using the PowerBook (FireWire) with a Studio Display (21" CRT) that displays a black screen, you can use the PowerBook's LCD to access the Studio Display's desktop.

To access the menu bar,

1 With power off, connect the Studio Display (21" CRT) to the PowerBook (FireWire).

2 Turn on the PowerBook (FireWire) and the Studio Display.

3 Launch the USB DSU, and click Create File. Then replace the CRT/video board as described in “Downloading Setup Parameters and Replacing the CRT/Video Board” in this chapter.

Once you have replaced the CRT/video board and need to make adjustments to the Studio Display (21" CRT) screen,

1 Shut down the PowerBook and reconnect the Studio Display (21" CRT) video and USB cables.

2 Restart the PowerBook, but when you hear the startup chime, close the lid of the PowerBook so the video image

will appear on the Studio Display only.

3 Once you see the Mac OS screen on the Studio Display, you can open the PowerBook lid.

4 Now you can adjust the Studio Display using the keyboard and trackpad on the PowerBook. Refer to “Adjusting the Display after Replacing the CRT/Video Board.”

Adjusting the Display after Replacing the Main Deflection Board

After replacing the main deflection board, perform the following adjustments for these five modes (screen resolutions):

- 640x480 at 67 Hz
- 832x624 at 75 Hz
- 1152x870 at 75 Hz
- 1280x1024 at 75 Hz
- 1600x1200 at 85 Hz

1 Using the control strip (or the Monitors control panel), select 1600x1200 at 85 Hz, the highest of the five screen resolutions.

2 Open the USB Display Service Utility (USB DSU) and click the Adjust Geometry button.

Note: Clicking the Adjust Geometry button causes the

DSU to automatically check high voltage (EHT). If the high voltage is out of range, the USB DSU will load a nominal value.

3 Refer to the procedure called “Checking High Voltage” in the Troubleshooting chapter to verify that the high voltage is 27 V (± 0.5 V). If the high voltage is not within range, adjust the high voltage using the USB DSU, the multimeter, and the high-voltage probe. Use the high voltage slider control on the USB DSU to make final adjustments.

4 Using the USB DSU, select the focus pattern (percent signs). Adjust horizontal and vertical focus controls (two top controls on the flyback transformer) for best center-of-screen performance. If necessary, readjust each focus control to optimize overall focus.

5 Using the USB DSU, click the H-Focus button to improve the dynamic focus. Drag the H-Focus slider control until

the screen shows the best overall focus balance from center to top, bottom, and sides of screen.

6 If necessary, repeat steps 3 and 4 for the best overall focus.

7 Check the screen to see if any minor geometry adjustments are necessary. If so, use the USB DSU geometry slider controls.

8 For the four remaining screen resolutions, check the screen, and if necessary, repeat this procedure but leave out steps 2, 3, and 4.